

## Technical data sheet and product guideline



# PD2

**Palladium solution for flash bath plating 2 g/l ready-to-use white color**

### Color coordinates



L	<b>83.8</b>
a	<b>0.4</b>
b	<b>4.3</b>
c	<b>4.3</b>

### Product form

Metal concentration	<b>2 g/l (Pd)</b>
Form	<b>Liquid</b>
Material color	<b>Yellow/Green</b>
Storage time	<b>2 years</b>
Format	<b>Ready to use</b>
Chemical type	<b>Alkaline</b>
Volume	<b>1 liter</b>

### Operating data

	Range	Optimal
Voltage (V)	<b>1.5 - 2.5</b>	<b>2</b>
Current density (A/dm <sup>2</sup> )	<b>0.3 - 1.0</b>	<b>0.5</b>
Working temperature (°C)	<b>20 - 35</b>	<b>30</b>
Exposure time (sec)	<b>45 - 120</b>	<b>90</b>
pH	<b>7.8 - 8.5</b>	<b>8.0</b>
Cathode efficiency (mg/Amin)	<b>2</b>	
Anode type	<b>Platinized titanium</b>	
Agitation	<b>Moderate</b>	

### Metal concentration

Metal	Range (g/l)	Optimal (g/l)
Palladium	<b>1-4</b>	<b>2</b>

### Deposit data

Purity (%)	<b>99.9</b>
Density (g/cm <sup>3</sup> )	<b>12</b>
Thickness (µm)	<b>0.02-0.20</b>
Appearance	<b>Shiny</b>
Color	<b>White</b>

### Preparation

PD2 is a ready-to-use galvanic bath at the concentration of 2 g/l of palladium. No preparation is required.

### Equipment

- Working vessel material: Pyrex glass / PVC / polypropylene
- Power supply: DC current rectifier with low residual AC (<5%).
- Heating element
- Anode type: Platinized titanium (1.5-2.5 µm)

For larger bath volumes:

- Magnetic driven filter pumps with 5-15 µm cartridge
- Amp/min counter

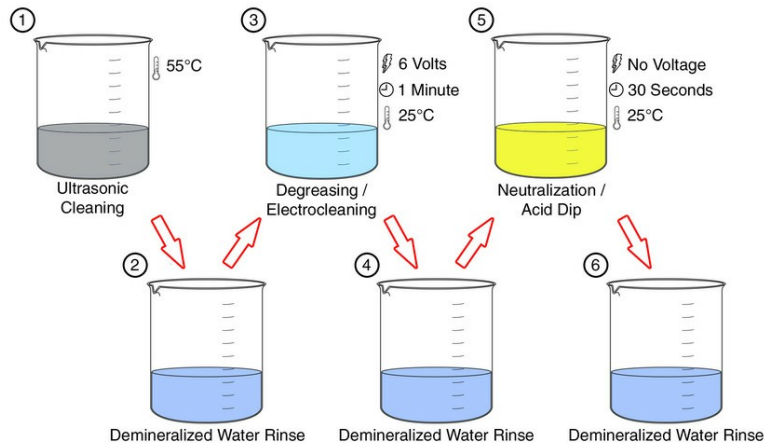
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### Pre treatment Cleansing procedure



### Bath maintenance

For small volume baths (up to 5-6 liters) use the bath until exhaustion, without adding any adding of replenishing unit PD20R or PD100R. For bigger baths, additions shall be performed using the appropriate replenishing unit as reported in the table below. For optimum performance of the bath, it is best to work with a bath concentration that is within 20% less than the initial concentration; for example, with a bath at 2 g/l nominal value, additions must be done after a maximum consumption of 0,4 g/l of Palladium. In order to perform the additions, always consider that a 2 g/l bath deposits on average 20 mg of Palladium per Ampere/minute. As Palladium is a precious metal, and in order to control consumption, periodic analytic controls are advised.

The replenisher units necessary in the PD2 process, are available in 20 g form (PD20R) and 100 g form (PD100R) of Palladium. Both replenisher units are composed by two separated compounds "A" and "B". PD20RA is containing the palladium salts and the PD20RB in containing the brighteners. The same concept is applied for PD100R. It is important to know that the palladium present in the unit "A" is a salt form and 2 grams of powder "A" contain 1 g of palladium metal. As the PD2 process has a cathodic efficiency of 20 mg per Ampere/minute, the PD2 bath loses approximately 20 g palladium metal every 1000 ampere/minute. So, for the reason for adding 20 g of palladium metal must to be added 40 g of PD20RA or PD100RA and 20 ml of PD20RB or PD100RB. It is recommended to stir the solution vigorously while adding the PD20RA or PD100RA.

#### IN CASE THE DEPOSIT IS MISSING BRIGHTNESS:

If the plating solution is giving dark deposits when the Pd concentration is in the optimum range it will be probably a problem related to a missing of brightenerers in the solution.

The same can be restored by adding respectively:

- 2.5 - 5 ml/l of PD-B1 at a time: do not exceed to a maximum of 10 ml/l of this brightener in order to not slow down too much the system;
- 10 - 50 ml/l of PD-B2-1LT at a time: this brightener (number 2) is well tolerated by the solution if added, just in case, in excess and it acts in order to complex the possible interfering metallic species as contaminants avoinding their co-deposition together with Pd.
- In case of missing foam in the plating solution add 2 ml/l of PD-WA, wetting agent for Palladium.

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### Post treatment

The electrolyte should be removed from the surface as quick as possible. Wash off the bath residual in a recovery rinse (still rinse). Rinse the parts in circulating deionized water and dry.

### Water purity

To prevent contamination of the bath both during its preparation and any subsequent replenishing operations, use demineralized water with a conductivity of less than 3  $\mu\text{S}/\text{cm}$  (containing no traces of organic compounds, Chlorine, Silicon, or Boron).

### Safety information

Although PD2 can be considered a product of low-toxicity, irritation to the skin, eyes and mucous membrane cannot be excluded. Caution should be exercised when using the product, avoiding contact with the eyes and skin. Use gloves and safety goggles. For further information please refer to the relative safety sheet.

### Supplementary Information

The items to be treated are prepared according to the usual process. In general it is recommended to start by degrease the pieces in an ultrasonic solution followed by rinsing and a subsequent alkaline electrolytic degreasing step at 5-6 volts for 1-2 minutes. Neutralization is done by immersion in a 5% sulfuric acid solution or similar solutions, followed by a rinse in demineralized water and the palladium plating step with moderate agitation of the pieces. **Avoid the application of too much high voltages as they can cause localized burns of the surface close to the high current density areas which will be visible after successive plating treatments even. If the palladium plating treatment is applied as an intermediate layer on white gold items which are then rhodium plated, it is importanto to do both plating steps in rapid sequence.** After the palladium plating treatment, the pieces are rinsed with demineralized water and neutralized before entering in the final rhodium plating solution. **Never perform complete electrolytic degreasing treatment on the palladium plated pieces** as it will cause blackening of the pieces due to the absorption of the gaseous hydrogen in the palladium layer and generated by the water reduction close to the cathode. If you have accidentally done this, an anodic treatment (inverted polarity) or heating of the pieces for a few minutes at 80°C should restore the original features of the plating.

### Disclaimer

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